

Timber Preservation

in **NEW ZEALAND**

Issued by

THE TIMBER PRESERVATION AUTHORITY

1958

TIMBER PRESERVATION
in
NEW ZEALAND

The functions of the
TIMBER PRESERVATION AUTHORITY
OF NEW ZEALAND

1958
Prepared by
THE TIMBER PRESERVATION AUTHORITY
Issued through
THE DEPARTMENT OF INDUSTRIES AND COMMERCE

Price 1s. 6d.

Contents

1. <i>Historical</i>	4
2. <i>What is Timber Preservation?</i>	4
3. <i>The Timber Preservation Authority</i>	5
4. <i>Inspecting and Testing Techniques</i>	8
5. <i>Preservation Specifications</i>	10
6. <i>Summary of Preservative Treatments</i>	11
7. <i>Relevant Extracts from the Timber Preservation Regulations</i>	13
8. <i>List of Registered Timber-treatment Plants</i>	16
9. <i>Appendix – Aspects Outside the Purview of the Authority</i>	20

Correspondence should be addressed to:

THE SECRETARY,
TIMBER PRESERVATION AUTHORITY,
P.O. BOX 1320,
WELLINGTON

Foreword

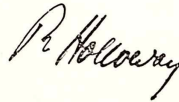
During the past ten years the timber preservation industry has developed and expanded to a remarkable degree.

This is not surprising when it is remembered that the demand for the traditional indigenous building timbers has far outstripped the available supplies and that recourse has had to be made to other varieties and grades of timbers. When these other types of timber are suitably treated they are at least equal to, if not better than, those which formerly were considered to be the only classes suitable for building purposes.

Preservative treatment is not limited to building timbers, but is used with advantage for increasing the life of railway sleepers, all classes of poles and mining timbers, and fencing materials.

In the short time it has been established the Timber Preservation Authority has made a great deal of progress toward its main goal of securing and maintaining a high standard of timber treatment and in furtherance of that aim has produced this booklet of general information.

I commend this booklet to all who are interested in the preservative treatment of timbers.



MINISTER OF INDUSTRIES AND COMMERCE

TIMBER PRESERVATION IN NEW ZEALAND

1. *Historical*

The dwindling supplies of durable indigenous timbers in New Zealand and the efforts to maintain the overall supplies of timber by planting forests of exotic trees created a situation in which the foreseeable timber supplies were likely to be of a less durable character.

For many years specifying authorities and timber users were in the fortunate position of having large quantities of indigenous heartwoods available for building purposes. Full use was made of this excellent timber, and the secondary grades were not used when and where the first-grade timber was available. However, the rapid development of this country and its expanded building programme, particularly in housing, made great inroads into the supply of timbers. The war of 1939-45 created a demand for the supply of timber for camps, defence buildings, hospitals, etc., and in addition large quantities were sent to the Islands and to Australia. During this period, the demand far outstripped the available supply of graded timber, and it became necessary to utilise the whole log in order to meet requirements. Buyers had to accept the run-of-the-log, and a large proportion of lower grade timber had to be used for general building purposes.

Realising that the sapwood of indigenous and exotic timbers was susceptible to the attacks of wood-boring insects and wood-destroying fungi, responsible people experienced anxiety regarding the possible life of the susceptible timbers if efforts were not made to evolve some sort of protection against these destructive agents.

The same problem had existed in other countries where it had been found that the most economic and efficient remedy was to impregnate the timber with chemical compounds which made it impossible for the destructive agents to operate. This approach through timber preservation was adopted in New Zealand and has been justified by subsequent experience.

2. *What is Timber Preservation?*

Timber preservation is, in simple terms, the protection of non-durable but otherwise useful timber from insects and decay by impregnating it with chemical preservatives. The types of preservative used are of a wide variety and are referred to later in this booklet. All these preservatives contain toxic elements which, if properly impregnated into the timber, will immunise it against insect attack and act as an effective deterrent against fungi.

The methods of treating timber to protect it against rot and borer infestation may be placed in the following categories:

(a) Pressure impregnation

The preserving liquids are forced into the wood under high pressure in steel cylinders. The preservatives used are chemicals dissolved in oil or in water or used undiluted. (For details see Section 6.)

(b) Diffusion

The timber is taken from the sawmill in its green state without drying and a water solution of a suitable preservative is applied to it. Provided the timber is not allowed to dry, the preservative will gradually diffuse into the centre of the timber through the water present in it. (For details see Section 6.)

(c) Hot and cold bath treatment with creosote or oil-soluble preservatives

Timber which is intended for ground-contact use is pre-dried and is then immersed in the heated preservative contained in an open tank. After the solution has been held at the prescribed temperature for the required length of time it is allowed to cool, or is pumped off and is replaced by a cold solution of the preservative. (For details see Section 6.)

Dip or brush treatments, if not part of a diffusion process, are not authorised by the Authority.

By defining and controlling the various preservation processes, the Authority aims to achieve results that will justify the use of treated timber in situations where untreated timber should not be used. It is confidently expected that, by constant research, sampling, and analysis, by examining and testing such new materials and processes as may come into use, and with the cooperation of plant operators, a high standard of preservation will be maintained and the timber resources of New Zealand will be widely utilised.

3. *The Timber Preservation Authority*

Background to Establishment

After World War II the number of timber-treating organisations increased considerably. The much expanded use of radiata pine and other New Zealand grown exotic softwoods, necessitated by the shortage of native timbers, raised the subject of timber treatment to a level of national importance.

As was but natural, the various treating organisations made claims as to the efficacy of their processes on the basis mainly of accelerated laboratory tests. In some cases, the better-known preservatives in use overseas had sufficient service records to justify these claims.

Though some satisfactory processes had been introduced from overseas, there was still interest in the possibility of developing alternative methods of treatment; accordingly the Plant Diseases Division of the Department of Scientific and Industrial Research carried out investigations on methods of impregnating timber, including the boron diffusion process used in Australia. A feature of this process is that the chemicals are applied direct to freshly sawn timber. The process was developed and simplified, and the results fully supported the Australian views on the efficacy of the treatment.

Several firms followed up this development by using the process on a modest scale, but though it had the approval of the Plant Diseases Division it was not generally accepted by the users.

This led to a request from the diffusion treaters that a full inquiry be made into this form of treatment and, as a result, a Committee of Inquiry was set up to hear evidence and prepare a report.

The Committee consisted of the late Mr H. R. Biss, solicitor, of Wellington, chairman, Professor F. G. Soper of Otago University, and Mr W. J. McKeon, representing the New Zealand Institute of Architects. The Committee was appointed in June 1952.

During the 21 sitting days of the inquiry, the Committee decided that most of the doubts and difficulties could be resolved by setting up a central Preservation Authority to which questions in dispute could be referred, or from which technical advice could be obtained.

In its reports to the Minister in Charge of the State Advances Corporation of New Zealand, the Committee strongly recommended the setting up of such an Authority, and suggested a form of legislation by which this could be achieved.

The Authority

As the result of the committee's recommendations, an interim Authority Committee was set up in September 1953 by the Minister of Industries and Commerce. This committee examined the scope of possible requirements and drew up draft regulations governing the setting up of the Authority and designating its powers. The Authority was eventually constituted by the Timber Preservation Regulations 1955 and the personnel announced in the *New Zealand Gazette* in December 1955. Representation on the Authority is (1957):

Chairman, Mr C. L. Bishop, A.P.A.N.Z., Municipal Association of New Zealand Inc.

The Secretary, Department of Industries and Commerce, *represented by:*

Mr H. L. Wise, M.COM., A.R.A.N.Z., F.R.E.S.; or

Mr A. B. McLauchlan, A.R.A.N.Z.

The Director of Forestry, *represented by:*

Mr T. T. C. Birch, M.A.(FOR.) (OXON).

The Commissioner of Works, *represented by:*

Mr F. D. Stewart, F.N.Z.I.A., A.R.I.B.A.

The General Manager, State Advances Corporation, *represented by:*

Mr K. J. Caverhill, A.R.A.N.Z.; or

Mr G. W. Hopkinson, LL.B., A.R.A.N.Z.; or

Mr L. E. Brooker, F.N.Z.I.A., A.R.I.B.A.

Department of Scientific and Industrial Research, *represented by:*

Mr L. W. Tiller, B.SC., A.N.Z.I.C.

New Zealand Institution of Engineers, Inc., *represented by:*

Mr I. W. Macallan, A.M.I.C.E., A.M.N.Z.I.E.

New Zealand Institute of Architects Inc., *represented by:*

Mr W. J. McKeon, F.N.Z.I.A.

New Zealand Timber Merchants' Federation Inc., *represented by:*

Mr C. W. Pollard, *Federation President.**

*Since March 1958 the New Zealand Timber Merchants' Federation has been represented by Mr E. W. D. Unwin, M.B.E.

Dominion Sawmillers' Federation Inc., *represented by:*

Mr H. R. Holt, B.SC.

New Zealand Master Builders' Federation Inc., *represented by:*

Mr E. R. Glass, *immediate Past-President*.

The Secretary of the Authority is Mr E. H. Clayton, A.R.A.N.Z.,
Department of Industries and Commerce.

Co-opted advisers and members of the Technical Subcommittee are:

Department of Scientific and Industrial Research

Mr K. M. Harrow, M.AGR.SC.

New Zealand Forest Service

Mr D. R. Carr, B.SC. (BOMBAY)*

State Advances Corporation

Mr H. B. Latter, B.FOR.SC.

The chairman of the Technical Subcommittee is Mr Tiller.

How the Authority Works

The Authority works as a whole, and with an Executive Committee of Wellington members. There are also three other subcommittees – one procedural, one technical, and one dealing with publicity.

The Executive Committee deals with routine business which does not require the attention of the full Authority.

The Procedural Subcommittee examines matters of policy and procedure for discussion and action by the Authority.

The Technical Subcommittee examines all available evidence relating to preservatives and processes, scrutinises applications for authorisation of treating plants, supplies technical advice to plant operators, and, in short, deals with all matters of a technical nature. All recommendations of the Technical Subcommittee are referred to the Authority which takes appropriate action after full discussion.

The main functions of the Authority are:

- (a) Authorisation of timber preservatives for use in New Zealand.
- (b) Authorisation of processes by which the preservatives are applied to the timber.
- (c) Preparation of specifications covering the methods to be employed in applying the various preservatives by the various processes.
- (d) Preparation of standard charge sheets for both pressure and diffusion processes.
- (e) Compilation of a register of all treating plants complying with the Authority's requirements.
- (f) Inspection of plants, prior to authorisation, to establish their ability to treat timber satisfactorily.
- (g) Deciding on the branding and marking of treated timber.
- (h) Collection and testing of samples of treated timber from time to time to check that the required standards of treatment are being maintained.

*Mr Carr resigned from the position in June 1958 and has been succeeded by Mr C. Ellis, B.E.(Q'NSL'D).

- (i) Conferring, as required, with representatives of treating organisations and suppliers of approved preservatives to discuss technical and administrative matters.

In the determining of specifications, and in all cases in which there is doubt about the authorising of a preservative or a process, the technical experts of the commercial treating organisations are given every opportunity of stating their case. The Authority's specifications are framed to accommodate, as far as possible, the views expressed.

To observe treating methods and to discuss the function of the Authority with plant operators, the Chairman of the Authority and the Authority's Senior Timber Preservation Officer have made goodwill visits to a number of plants in the North Island.

The Authority pools useful information and this is available to anyone interested in timber preservation.

It has been emphasised in all notices to operators that the Authority is not merely a policing agency. Its aim is to help operators and to interfere as little as possible with the operation of registered plants, all of which are recognised as providing a useful service in the national interest. It endeavours to achieve uniformity and order in all plants, and to ensure that operators observe a high standard of yard and plant hygiene. The principal objective of the Authority is to secure and maintain a high standard of timber preservation so that treated timber may be marketed and used with confidence.

The Authority's Field Officers

To carry out the Authority's field work the Minister appointed an officer of the Forest Research Institute, Mr D. R. Carr, as Senior Timber Preservation Authority Officer and has since appointed a number of officers of the New Zealand Forest Service as Timber Preservation Authority Officers in the following areas: Auckland (3 officers), Rotorua (4), Tauranga (1), Wellington (5), Christchurch (1), Dunedin (1), Kaikohe (1), Gisborne (1), New Plymouth (1), Napier (1), Taumarunui (1), National Park (1), Reefton (1), and Invercargill (1). The officers in these areas carry out a plant-inspection service under the direction of the Senior Timber Preservation Authority Officer. They are all experienced timber men, are well known to the trade, and can be relied upon to carry out their task impartially.

4. Inspection and Testing Techniques

After a preservative and process are authorised, it is necessary to ensure that the requirements laid down in the various specifications are adhered to by the treating plants.

These requirements are designed to safeguard the interests of both the users of treated timber and the timber preservation industry. Failure to comply with the Authority's specified requirements could lead to withdrawal of approval, and removal of the plant concerned from the register.

The Authority has instituted an inspection and testing system. This does not, however, preclude any private arrangement for additional

inspection that the purchaser of treated timber may make with the supplier.

The Authority's field staff are Timber Inspectors of the New Zealand Forest Service, and they conduct the Authority's inspection requirements in addition to their normal duties.

The Authority's analyst is located at the Forest Research Institute, Whakarewarewa, Rotorua, where laboratory facilities and qualified personnel have been provided for the chemical analysis of treating solutions and treated timber. The laboratory is devoted solely to the work of the Authority, and all analytical results are reported to the Authority. So far as the analytical staff is concerned, samples are identified by numbers only, the identity of plants being known only to members of the Authority's inspection staff.

Generally, the Authority expects the field officers to inspect individual plants on an average of once in five weeks, at irregular intervals. Field officers are entitled to inspect the plant facilities to ensure that they meet the minimum prescribed standards, and to take samples of the treating solution. The main emphasis, however, is laid on inspection of the treated timber, as it is considered that the end results in the timber itself are a very necessary criterion of the standard of treatment.

In the case of sawn building timbers, 10 samples of treated wood (of any given size or timber species) are taken from a charge. The test sample must be at least 9 in in length. If timber is pressure treated, the sample must be taken at least 18 in or more from the end of a stick, and if diffusion treated, at least 4 in from the end to avoid the high loading resulting from the greater permeability of the end grain. As far as practicable, the test samples are of sapwood. Field staff have been advised to consult the plant manager and accept his guidance on the validity and nature of the sample as being representative of the timber sampled.

Field staff take samples so as to cause a minimum of damage to treated stocks. Special pre-framed lines or custom-treated stock are not sampled without the prior consent of the owner. If requested, field staff leave a duplicate marked sample with the plant manager.

The 10 test samples taken are serially numbered, and no other identification marks are made. They are forwarded, along with a field record sheet showing plant name, charge number, details of treatment, and other relevant data, to the Senior Timber Preservation Authority Officer at Rotorua. All 10 samples are then given to the Timber Preservation Analyst with limited data, namely, the type of treatment and the expected "core" retentions. The results of his analyses are reported back to the Senior Officer, who adds to the analyst's report the plant name and number, charge number, and other data relevant for record purposes and for identification of the original source of the test samples. The plant manager concerned is advised of the results of the test.

If the results of an initial test at a plant indicate a lower standard of treatment than that specified, the field officer is requested to take 10 more samples. If the second set is also unsatisfactory, the plant is

examined in greater detail. In this event the plant concerned may elect to have further samples taken and examined by their own technical advisers. If a consistently poor standard of treatment is thus established, it is necessary for the Authority to consider either withdrawal of its authorisation of the plant, or application of the disciplinary clauses provided for such cases in the Timber Preservation Regulations, or both.

With products such as fence posts and poles, plant operators must determine the net retention of preservative in each charge in the normal course of their process control, and are required to take borings to determine the depth of penetration obtained.

From time to time the Authority's field staff examine treated timber either in the yard or as it is removed from the treating cylinder or vat, to ensure that the penetration requirements are being obtained.

A further requirement of the Authority is that all plants must forward a copy of every treatment charge sheet to the Senior Timber Preservation Authority Officer for scrutiny.

The measures outlined here cannot guarantee that every piece of treated timber in a charge conforms to the specified requirements, but, because the retentions have been set at a high level, with a generous safety factor, the few pieces that may be substandard are unlikely to fail in service.

These procedures are intended to ensure that a high standard of treatment is achieved and maintained, and that any significant or prolonged deviation from the desired standard is detected so that appropriate action can be taken.

5. Preservation Specifications

If timber preservation is to be done satisfactorily as a routine job, its details must be set out in specifications.

The Authority has prepared specifications which deal with the preservation of the principal types of timber with the preservatives now used: that is, the preservation of sawn timber with preservatives dissolved in water, and the preservation of posts and poles and other timbers exposed to the weather, or in contact with the ground, with creosote or pentachlorophenol or with preservatives dissolved in water. In an endeavour to make the specifications both satisfactory to the consumer and practicable for the plant operator, the chief wood-preserving firms and large-scale users of treated timber were consulted before the details of the specifications were decided upon. Timber preservation in New Zealand is a growing industry and much remains to be learned by experience. For this reason the specifications are to be reviewed within a year of their adoption.

The most important item in a specification for preserving wood is the amount of preservative to be used; the decisions on this point were taken only after much discussion and deliberation, the Authority doing its best to apply overseas experience to New Zealand conditions with an understanding of both.

The remainder of the specification is designed to make sure that the amount of preservative decided upon is applied in such a way that it

will really protect the wood. For example, when sawn timber is treated the preservative must go right through, so that, when subsequently cut, untreated wood will not be exposed. On the other hand, a well treated post should have a heavily treated exterior zone so thick that it cannot be penetrated by cracks which would allow rot to reach the untreated interior.

The foregoing section sums up the specifications, but those who wish to study them in more detail may obtain copies from the Authority.

Branding of Preservative-treated Timber

To protect the users of preservative-treated timber and the plant operators against the marketing of timber treated by unregistered plants, and to provide a ready and unequivocal means of tracing timber to the plant carrying out the treatment, the Authority decided that from 1 October 1957 substantially all preservative-treated sawn timber must be end-branded with the plant number allocated by the Authority. The requirement for end-branding is that all treated timber must be branded on or at one end with a clear legible brand in block letters not less than $\frac{3}{8}$ in high including the plant number allocated by the Authority. Fencing timbers and timbers under 2 in \times 1 in in size need not be end-branded. The branding must be carried out before the timber leaves the treatment plant.

As a further means of identifying preservative-treated timber which is subsequently processed into weatherboards, flooring, or scantlings planer gauged four sides, the Authority requires that each piece so processed in random length form shall be branded at least once not less than 12 in from one end with an incised or permanently inked brand indicating that the timber has been treated. In the case of weatherboards and flooring the brand preferably shall be impressed on the back of the board.

In addition, the Authority has prescribed that each piece of timber treated with a colourless preservative must have its surface completely coloured with a red dye.

The Authority is now considering the advisability and feasibility of colouring the body of the timber, as well as the surface, as an aid to the recognition of the treatment.

6. Summary of Preservative Treatments Approved as at 31 August 1958

Note: Except where otherwise stated, the retentions and percentages of water-soluble preservatives are expressed in terms of the anhydrous compounds.

1. Pressure Treatments

A. Water-soluble preservatives applied in conformity with the Authority's specifications

- (i) *Boliden S 25:* Approved (a) for the treatment of building timbers not in contact with the ground, subject to the achievement of a minimum overall retention of 0.19 lb/cu. ft., and a minimum core loading of 0.06 per cent arsenic pentoxide (As_2O_5) in the

sapwood zone, and (b) for the treatment of timber *in contact with the ground* subject to the achievement of a minimum overall retention of 0.4 lb/cu. ft.

- (ii) *Tanalith U*: Approved for the treatment of building timbers *not in contact with the ground*, subject to the achievement of a minimum overall retention of 0.35 lb/cu. ft.
- (iii) *Tanalith C*: Approved (a) for the treatment of building timbers *not in contact with the ground*, subject to the achievement of a minimum overall retention of 0.30 lb/cu. ft. and a minimum core loading of 0.06 per cent arsenic pentoxide (As_2O_5) in the sapwood zone, and (b) for the treatment of timber *in contact with the ground* subject to the achievement of a minimum overall retention of 0.63 lb/cu. ft.
- (iv) *Celcure A*: Approved (a) for the treatment of building timbers *not in contact with the ground*, subject to the achievement of a minimum core loading of 0.06 per cent arsenic pentoxide (As_2O_5) and a minimum overall retention of 0.31 lb (hydrated salts) per cubic foot; and (b) for the treatment of timber *in contact with the ground*, subject to the achievement of a minimum overall retention of 0.70 lb (hydrated salts) per cubic foot.
- (v) *Celcure plus boric acid*: Approved for the treatment of building timbers *not in contact with the ground*, subject to the achievement of a minimum overall retention of 0.39 lb of Celcure plus 0.125 lb of boric acid per cubic foot (equals 0.625 lb hydrated compounds per cubic foot).
- (vi) *Boron compounds*: Approved for the treatment of building timbers *not in contact with the ground*, subject to the achievement of a minimum overall retention of 0.35 lb/cu. ft.

B. *Creosote and oil-soluble preservatives applied in conformity with the Authority's specifications*

- (i) *Creosote*: complying with N.Z. Standard Specification No. 401, is approved for the treatment of natural-round timbers to be used in contact with the ground, subject to the following conditions:
 - (a) For posts of Douglas fir and larch, a retention of 7 lb/cu. ft. and a penetration of not less than 70 per cent of the sapwood in 80 per cent of the pieces treated.
 - (b) For poles, piles (other than marine), and strainers (strainers being posts of the following minimum dimensions: length 7 ft 10 in and top diameter 7 in) of Douglas fir and larch, a retention of 8 lb/cu. ft. and a penetration of not less than 70 per cent of the sapwood in 80 per cent of the pieces treated.
 - (c) For posts, poles, and piles (other than marine) of pinus species, a retention of 8 lb/cu. ft. and a minimum penetration of 1 in.
- (ii) *Pentachlorophenol, 5 per cent solution in petroleum oil*: complying with the Authority's specifications for both chemical and oil, is approved for the treatment of natural-round timbers to be used in contact with the ground, subject to the qualifications (a), (b), and (c) as for creosote.

2. *Hot and Cold Bath Treatment*

Creosote and oil-soluble preservatives applied in conformity with the Authority's specifications.

Approved for the same purposes and under the same conditions as for creosote and oil-soluble preservatives applied by pressure – see 1. B. (i) and (ii) above.

3. *Diffusion Treatments*

- (i) *Boron compounds*: The use of boron compounds applied by the following methods to achieve a minimum core retention of 0.2 per cent boric acid has been approved for the treatment of the under-mentioned species of building timbers *not in contact with the ground*:
 - (a) *Methods of treatment (conforming with the Authority's specifications)*
 - (i) Momentary immersion.
 - (ii) Hot immersion.
 - (iii) Steam and cold quench (limited, at present, to the treatment of 1 in Tawa).
 - (b) *Species of building timbers*
Rimu, taraire, rewarewa, matai, mangeao, radiata pine, tawa, pukatea, Douglas fir, larch, miro, Corsican pine, and kahikatea.
- (ii) *Tanalith D*: Approved for the treatment of mining timbers subject to the achievement of a minimum overall retention of 0.35 lb/cu. ft.
- (iii) *Osmosar*: Approved for the treatment of mining timbers subject to the achievement of a minimum overall retention of 0.25 lb/cu. ft. (equals 0.50 lb of hydrated compounds per cubic foot).

7. *Relevant Extracts from Timber Preservation Regulations 1955* (Serial No. 146)

“Section 8.

- (1) The principal function of the Authority shall be to secure and maintain a high standard of timber preservation.
- (2) In pursuance of this function the Authority may:
 - (a) Examine such preservative treatments as may from time to time be brought to its notice for the purpose of determining the efficiency and suitability thereof:
 - (b) Authorise for the purposes of these regulations any preservative treatment which complies with all requirements, conditions, specifications, and codes of practice in respect thereof which the Authority may prescribe:
 - (c) Revoke or suspend the authorisation of any preservative treatment if it is satisfied that the treatment does not afford adequate protection or that the treatment is not properly effected:

- (d) Require any person engaged in the preservative treatment of timber to comply with any specification or code of practice formulated or adopted by the Authority:
- (e) Receive, and in its discretion approve, any application from any person for an authorisation of any preservative treatment of timber; and require from any such applicant such information as will enable the Authority to satisfy itself that full compliance with the treatment is likely to be attained:
- (f) Require any person engaged in the preservative treatment of timber to institute and maintain, to the satisfaction of the Authority, a control of his preservative treatments by the use of such methods of treatment, processes, inspections, and tests as will ensure that every preservative treatment will comply with the relevant authorised preservative treatment; and to maintain such records and documents as in the opinion of the Authority are necessary to establish that the control of the preservative treatments as aforesaid is maintained:

Section 9.

(2) In the discretion of the Authority any such authorisation (*vide* regulation 8 (2)) may be varied, or may be suspended for a period not exceeding one month, or may be revoked:

Provided that the Authority shall give the holder of the authorisation at least 14 days' notice in writing of its intention to revoke the authorisation and shall state the reasons for the revocation.

(3) An objection to any such revocation shall be made in writing and shall be lodged with the Minister within 14 days after the date of the giving of the notice of revocation.

(4) Upon receipt of any such objection, the Minister shall appoint a suitable person to inquire into and determine the subject matter of the objection, and that person may call for such reports as he requires to acquaint himself with the facts of the case, and may require the Authority to affirm, vary, or reverse its previous decision.

(5) Pending the determination of the objection as aforesaid the revocation shall be suspended.

Section 10.

(1) Any officer or employee of Her Majesty in respect of the Government of New Zealand and any officer or employee of any local authority, if the officer or employee is so authorised in writing by the Minister, may at any reasonable time:

- (a) Enter any premises where timber is subjected to preservative treatment or where there is plant for such treatment or where timber which has been preservative treated or is alleged to have been preservative treated is sold or offered for sale or stored or is used in the manufacture of any article for sale or is used in the erection of any building or structure:

(b) Inspect any records and documents kept pursuant to a requirement of the Authority under regulation 8 (2) (f) hereof, and take extracts therefrom:

(c) Carry out any tests within the premises, or remove or cause to be removed from the premises for testing purposes preservative materials, preservative solutions, or portions or samples of timber which have been preservative treated or are alleged to have been preservative treated, whether or not the timber has been or is being used in the manufacture of any article or in the erection of any building or structure.

(2) Any person who in any way obstructs, hinders, prevents, or interferes with any such officer or employee who is authorised as aforesaid in the exercise of any of the powers conferred on him by or under these regulations, or who fails to afford such assistance as he is reasonably required to render by any such authorised officer or employee, commits an offence against these regulations, and shall be liable accordingly to the penalties specified in section 30 of the Board of Trade Act 1919.

Section 12.

(1) No person shall describe or represent any timber to have been preservative treated, or use any mark or identification which conveys or is likely to convey an impression that any such timber has been so treated, unless:

(a) The timber has been treated in accordance with some authorised preservative treatment; and

(b) In any case where the Authority has (by a current notice which has been published in the *Gazette*) required the timber to be marked or otherwise identified, the timber has been so marked or identified.

(2) Nothing in this regulation shall apply to any timber which has been used before the commencement of this Part of these regulations in the manufacture of any article or in the erection of any building.

Section 13.

Every person commits an offence against these regulations and shall be liable accordingly to the penalties specified in section 30 of the Board of Trade Act 1919 who acts in contravention of or fails to comply in any respect with any provision of these regulations or of any requirement of the Authority under these regulations."

8. *List of Timber-treatment Plants Registered With the Authority
as at 17 September 1958*

Registered No.	Name	Location	Type of Treatment
<i>Northland</i>			
9	Claude Kelly Ltd.	Wellsford	Boron by diffusion
14	Lane & Sons Ltd.	Totara North	"
49	C. R. Lovatt & Son Ltd.	Whangarei	Tanalith
64	Kaipara Pinus Sawmills Ltd.	Topuni	"
66	Rowsell & Rowsell Ltd.	Kaikohe	"
84	Dargaville Timber Im- pregnation Co. Ltd.	Dargaville	"
92	Kaingaroa Timber Mill (Northland) Ltd.	Kaingaroa	Boron by diffusion
<i>Auckland</i>			
3	Tamaki Sawmill Co. Ltd.	Auckland	"
6	Northern Dowel (Auck- land) Ltd.	Auckland	"
31	F. and B. Jones Ltd.	Glen Eden	"
47	N.Z. Forest Products Ltd.	Pinedale	Celcure, Boliden, and Tanalith - for radiata pine only
72	Hickson's Timber Im- pregnation Co. (N.Z.) Ltd.	Glen Eden	Tanalith
73	Hickson's Timber Im- pregnation Co. (N.Z.) Ltd.	Onehunga	"
87	Commercial Pine For- ests Ltd.	Takapuna	"
88	Hutt Timber & Hard- ware Co. Ltd.	Panmure	"
98	H. A. McMillan & Sons Ltd.	Riverhead	Boron by diffusion
<i>South Auckland</i>			
1 and 2	Geo. Syme & Co. Ltd.	Edgecumbe	"
4	Smith Harvey Ltd.	Tauranga	"
5	Fletcher Timber Co. Ltd.	Ngongotaha	"
7	Whakatane Timber Mills Ltd.	Whakatane	"
18	Fletcher Timber Co. Ltd.	Ruatahuna	"
21	T. J. Magee	Mt. Maunganui	"
22	Timber Kilns Ltd.	Rotorua	"
23	Tuck Bros. (Exotics) Ltd.	Taupo	"
29	Bunn Bros. Ltd.	Tauranga	"
39	N.Z. Forest Service	Waipa	Pentachlorophenol and creosote for natural- round timbers
43	N.Z. Forest Service	Waipa	Boron by diffusion

Registered No.	Name	Location	Type of Treatment
<i>South Auckland—continued</i>			
46	N.Z. Forest Products Ltd.	Kinleith	Celcure, Boliden, Tanalith, Boron by pressure, and Pentachlorophenol for natural-round timbers
50	Putaruru Timberyards Ltd.	Putaruru	Boron by diffusion
60	Mataora Timber Co. Ltd.	Waihi	Tanalith
61	Boon Sullivan Luke Ltd.	Whakatane	"
62	Maramarua Sawmilling Co. Ltd.	Maramarua	Tanalith, and Boron by pressure
65	Tasman Pulp and Paper Co. Ltd.	Kawerau	Boliden, Tanalith, and Boron by pressure
68	Taupo Totara Timber Co. Ltd.	Putaruru	Tanalith
69	Timber Preservation (Taumarunui) Ltd.	Taumarunui	"
71	Hutt Timber & Hardware Co. Ltd.	Tokoroa	Tanalith, and Boron by pressure
74	Hickson's Timber Impregnation Co. (N.Z.) Ltd.	Frankton Junction	Tanalith
80	Tauhara Timber & Joinery Co. Ltd.	Taupo	"
81	Tauranga Joinery Co. Ltd.	Tauranga	"
89	Tasman Pulp & Paper Co. Ltd.	Kawerau	Boron by diffusion.
91	E. J. Bowen Ltd.	Te Puke	"
93	Carter Merchants (Morningside) Ltd.	Pouakani	Tanalith
94	Putaruru Timberyards Ltd.	Putaruru	"
96	Ellis and Burnand Ltd.	Putaruru	Boron by diffusion.
97	Tokoroa Pine Contracting Co. Ltd.	Upper Atiamuri	Pentachlorophenol for natural-round timbers by hot/cold bath
100	Taupo Totara Timber Co. Ltd.	Tokoroa	Tanalith
104	Hickson's Timber Impregnation Co. (N.Z.) Ltd.	Rotorua	Tanalith
105	N.Z. Forest Service	Waipa	Boliden, and Boron by pressure
<i>Gisborne</i>			
13	Tolaga Bay Sawmill	Tolaga Bay	Boron by diffusion
58	Odlin Timber & Hardware Co. (Gisb.) Ltd.	Gisborne	Tanalith
<i>Hawke's Bay</i>			
56 and 57	Robert Holt & Sons Ltd.	Napier	Tanalith
101	Tutira Timber Treatments	Waikoau	Pentachlorophenol for natural-round timbers by hot/cold bath
<i>Taranaki</i>			
11	Carnea Sawmills Ltd.	New Plymouth	Boron by diffusion
12	McAlpine Bros. Ltd.	Oakura	"
59	Taranaki Timber Impregnation Co. Ltd.	New Plymouth	Tanalith
78	Fazackerley Timber Impregnation Co. Ltd.	Stratford	"
99	Clement and Davis	Opunake	"

Registered No.	Name	Location	Type of Treatment
<i>Wanganui-Manawatu</i>			
10	Funnell's Timber Co. Ltd.	Bulls	Boron by diffusion
15	Marton Sash, Door, & Timber Co. Ltd.	Marton	"
41	Wood Enterprises Ltd.	Wanganui	Boliden, and Boron by pressure
70	Perham Larsen (Manawatu) Ltd.	Palmerston North	Tanalith, and Boron by pressure
75	Hickson's Timber Impregnation Co. (N.Z.) Ltd.	Marton	Tanalith
103	T. W. Wall Ltd.	Waverley	"
<i>Wairarapa</i>			
45	C. E. Daniell Ltd.	Masterton	Boliden, and Boron by pressure
83	W. Booth & Co. Ltd.	Carterton	Tanalith
<i>Wellington</i>			
67	Evans Bay Timber Co. Ltd.	Wellington	"
76	Hickson's Timber Impregnation Co. (N.Z.) Ltd.	Taita	"
82	Paraparaumu Timber & Hardware Co. Ltd.	Paraparaumu	"
86	Ranginui Timber Supplies (Levin)	Levin	Tanalith, and Boron by pressure
102	Armstrong Timber Co. Ltd.	Tawa Flat	Boliden
<i>Nelson</i>			
20	Tasman Forests Ltd.	Upper Moutere	Boron by diffusion
42	H. Baigent & Sons Ltd.	Stoke	Boliden, and Boron by pressure
51	J. D. & L. Robertson Ltd.	Nelson	Tanalith
53	H. Baigent & Sons Ltd.	Motueka	Tanalith, and Boron by pressure
<i>Marlborough</i>			
52	Marlborough Timber Co. Ltd.	Blenheim	"
<i>Canterbury</i>			
25	N.Z. Forest Service	Hanmer	Creosote and Pentachlorophenol for natural-round timbers by hot/cold bath
30	Cook and Sons (Sawmillers) Ltd.	Pleasant Point	Boron by diffusion.
40	Wiseman Timber Preservations Ltd.	Christchurch	Boliden, and Boron by pressure
77	Hickson's Timber Impregnation Co. (N.Z.) Ltd.	Christchurch	Tanalith
79	Desmond Unwin Ltd.	Timaru	"
90	Culverden Sawmillers Ltd.	Culverden	Boron by diffusion
<i>Westland</i>			
95	George Williams	Ikamatua	Osmosar - for mining timbers only

Registered No.	Name	Location	Type of Treatment
<i>Otago</i>			
54	Hogg Co. Ltd.	Dunedin	Tanalith
<i>Southland</i>			
48	N.Z. Forest Service	Conical Hill	Boron by diffusion
63	Geo. Poole & Sons Ltd.	Invercargill	Tanalith

Additional Timber-treatment Plants

This space has been provided for the addition of the names of timber-treatment plants registered with the Authority subsequent to the printing of the booklet.

9. APPENDIX

Aspects Outside the Purview of the Timber Preservation Authority

1. Chemicals sold for pre-treatment of timber
2. Eradication of borer infestations

From what has been said earlier in this booklet it will be evident that the Authority has to satisfy itself on two major issues before it will approve a process. The first is that the chemicals used in the process are in themselves toxic to the organisms that attack timber. The second is that the method of application is capable of distributing enough of the chemical throughout the timber so that no part is left unprotected. Unless both the chemicals and the method of application comply with the requirements of the Authority, the necessary protection for the user cannot be ensured.

1. Chemicals sold for pre-treatment of timber

Because of the foregoing considerations the Authority does not approve proprietary products that are being offered for sale as timber preservatives and are intended for application by the purchaser to timber that is to be used for building construction. The chemicals may in themselves be effective, but for most purchasers the only available methods of application will be brushing, spraying, or dipping. With the chemicals offered, none of these methods gives adequate penetration; the only satisfactory surface-treatment methods are those employed in the approved diffusion processes in which a number of special conditions, including full chemical control, have to be met. Since it is not possible with application methods available to private users to secure protection to the degree required by the Authority, it does not approve products sold for individual use by the purchaser.

2. Eradication of borer infestations

The other field into which the Authority does not enter is that of attempted eradication of borer infestations from existing structures. There are two reasons for this. First is that by statute the Authority is charged solely with the responsibility for the treatment of timber before it goes into use in buildings or other structures. Second is that in most structures some of the timber is inaccessible, and for this reason attempts to kill insects in the timber will, with the exception mentioned later, not be fully effective nor, in general, will they give more than relatively short-term protection from subsequent attack. The only method by which the owner of timber structures can be assured of full protection for his assets is for him to see that in the first instance they are constructed from properly preservatised timber. The Authority concerns itself only with treatments that can be expected to protect the timber throughout its life.

Although it does not approve treatments or processes that are claimed to be capable of arresting existing borer infestations in buildings, the Authority is aware that property owners become very concerned about any borer damage that appears. They want to know if anything can be done to eradicate the insects, short of replacing damaged timber.

Because of this anxiety it is thought appropriate to give a brief summary of such information as is available from scientific investigations conducted in New Zealand. Research in this field has been carried out since 1947 at the Plant Diseases Division of the Department of Scientific and Industrial Research. A first account of the experiments was published in the *N.Z. Journal of Science and Technology*, May 1952. Requests for additional information should be sent to the Plant Diseases Division, Private Bag, Auckland.

The work of the Plant Diseases Division indicated that power kerosene produced moderately effective results, but in cases where diesel fuel oil could be used it was found that it was the cheaper and much more effective treatment. The oil can be applied by a liberal brushing or spraying treatment. The advantage of the diesel fuel oil is that it readily penetrates the timber and evaporates very slowly. However, there are indications that retreatment may be necessary after five to 10 years. It has one disadvantage in that it leaves some residual staining and a slight oiliness on the timber. It is, therefore, limited to surfaces on which stain can be tolerated, and sheds, and outhouses. For unpainted timber in locations where staining cannot be tolerated—for instance wooden linings behind scrim and paper—a liberal brush coat of a 5 per cent solution of p.p.i. DDT* in a non-staining oil solvent (mineral turps, for example) is recommended. For furniture and other painted or varnished woodwork, where absorption from surface application cannot take place, intensive hand gunning into the exit holes with a 10 per cent solution of dichloroethylether in power kerosene by means of a pressure gun equipped with a fine tapered nozzle was the best of the non-staining treatments, but it will not prevent subsequent re-infestation. Hand gunning alone, particularly when the infestation is slight, is a less effective method of control, however, than either of the brush treatments mentioned above. The foregoing methods are particularly useful for scattered infestations.

Where the infestation is general throughout a building, and particularly where the two-tooth longhorn borer is established, it would probably be wiser to use a gassing process in which a structure is completely enclosed within an impervious sheet of plastic and is then treated with methyl bromide gas. Given adequate time for penetration of the gas and sufficiently favourable conditions, this treatment should give good control of infestation, but obviously it will not give protection from subsequent reinfestation. Methyl bromide is an extremely poisonous gas and should not be used without prior consultation with the local Medical Officer of Health.

Insecticidal smoke bombs are not very effective because their residual effect lasts for only a very short period.

*Note: It is necessary to make sure that the percentage of DDT is calculated on the basis of its content of the particular form known as the "para-para-isomer" (p.p.i.). There are other forms of DDT, but they are not chemically active insecticides.

